

CLAIMS

1. Device to control the straightness and torsions of a long product (11), characterized in that it comprises at least two profile-detection optical devices (12a, 12b, 5 12c), each presenting a visual field (13) including at least a perimeter segment (18a, 18b, 18c) of the section of said product (11), said at least two devices (12a, 12b, 12c) being arranged adjacent and aligned along said product (11) and being oriented so as to detect homologous 10 perimeter segments (18a, 18b, 18c) located on different planes, the device also comprising a command unit able to receive and compare with each other the section images detected at the same instant by said detection devices (12a, 12b, 12c) and to determine, according to said 15 comparison, the lack of straightness and/or the presence of torsions in said product (11).
2. Device as in claim 1, characterized in that in order to detect the lack of straightness in said long product (11) it comprises at least three of said devices (12a, 12b, 20 12c).
3. Device as in claim 1 or 2, characterized in that said at least two devices (12a, 12b, 12c) are suitable to detect the profile on respective planes, substantially parallel to each other and substantially orthogonal to the direction of 25 longitudinal development of the product (11) and at a reciprocal known distance.
4. Device as in any claim hereinbefore, characterized in that each of said devices (12a, 12b, 12c) comprises at least an emitter element (20) to emit a beam of light that 30 intercepts at least part of the section of the product (11) and at least an image detection means (17).
5. Device as in claim 4, characterized in that said beam of light is a laser beam (19).

6. Device as in claim 4, characterized in that said image detection means is a TV camera (17).

7. Method to control the straightness and torsions of a long product (11), characterized in that it provides a  
5 first step wherein at least two profile-detection optical devices (12a, 12b, 12c), each presenting a visual field (13) including at least a perimeter segment (18a, 18b, 18c) of the section of said product (11), are arranged in a position adjacent and aligned along said product (11) in  
10 order to detect homologous perimeter segments (18a, 18b, 18c) lying on respective different planes and substantially orthogonal to the longitudinal development of the product (11), a second step wherein said at least two detection devices (12a, 12b, 12c) are simultaneously activated in  
15 order to detect a relative perimeter segment (18a, 18b, 18c) of said section, and a third comparison step wherein the images relating to said perimeter segments (18a, 18b, 18c) are compared with each other in order to determine the lack of straightness and/or the presence of torsions in  
20 said product (11).

8. Method as in claim 7, characterized in that before the comparison step, it provides a step wherein the images relating to said perimeter segments (18a, 18b, 18c) are at least processed in order to be positioned all with respect  
25 to a common spatial reference.

9. Method as in claim 7 or 8, characterized in that it provides a preliminary step of setting said detection devices (12a, 12b, 12c) wherein a sample product, without either torsion or flexion, is subjected to measurement by  
30 said devices (12a, 12b, 12c) in order to make therefrom a model image to be compared with the image detected of the product (11).

10. Method as in claim 7 or 8, characterized in that it

provides to memorize, in a data base, images relating to a plurality of sample profiles, and to select, from said data base, at the start of the control step, a sample profile corresponding to the profile of said product (11) in order  
5 to use said sample as a model during the comparison step with the images detected.

11. Method as in any claim from 7 to 10 inclusive, characterized in that it provides a step of identifying and separating, from the detected entity of flexion or torsion,  
10 contributions determined by mechanical actions applied on a product (11) having high elastic characteristics, said identification and separation step being based on the identification of typical frequencies of resonance of said product (11) and on the subsequent elimination of said  
15 contributions pertaining to elastic oscillations of the product (11).

12. Method as in any claim from 7 to 11 inclusive, characterized in that it provides to reconstruct the entire profile of said product (11) using a plurality of  
20 sequential detections performed by said detection devices (12a, 12b, 12c) and interpolating homologous points relating to said sequential detections between each other.

13. Method as in claim 12, characterized in that it provides that the determination of the lack of straightness  
25 or of the presence of torsions in said product (11) is performed on said profile of the reconstructed product (11).